

CLAIMS

1. A metal detecting device for the detection of a metal object concealed in shoe or on a leg of a subject, comprising:
 - a housing with a platform having an upper surface with indication areas thereon for the correct positioning of each of a subject's feet;
 - left-foot and right-foot electromagnetic coils under the indication areas connected to a power supply via an oscillator and a switch;
 - an electromagnetic shield divider between the left-foot and right-foot electromagnetic coils;
- 5 10 a detection system for the detection of the placement of the subjects feet on the indication area;
 - a processing unit for processing signals from the electromagnetic coils and detection system; and
 - 15 a display connected to the processing unit for displaying a warning signal if metal is detected.
2. A metal detecting device as claimed in claim 1, wherein said power supply is a DC power source provided by a dedicated power pack.
3. A metal detecting device as claimed in claim 2, wherein said power supply is rechargeable.
- 20 4. A metal detecting device as claimed in claim 1, wherein said power supply is a mains power supply.
5. A metal detecting device as claimed in claim 1, wherein said detection system for detection of the correct placement of the subject's feet comprising pairs of IR-LEDs and IR detectors.
- 25 6. A metal detecting device as claimed in claim 1, further comprising two secondary metal detector coils per foot.

7. A method for detecting metal objects concealed in a shoe or on the lower part of a leg of a subject using a device as claimed in claim 1, comprising the steps of:

- a. applying current to a first left-foot electromagnetic coil, and a first right-foot electromagnetic coil in turn for a short time period that is typically several milliseconds and recording eddy current signals therefrom;
- b. comparing signal from the first left-foot electromagnetic coil with signal from the first right-foot electromagnetic coil to eliminate effect of background interference;
- c. positively detecting the presence of a subject's legs, correctly positioned with respect to said indication on said platform via a detection system;
- d. comparing signal obtained from first left-foot electromagnetic coil with signal obtained from first right-foot electromagnetic coil when the presence of a correctly positioned subject's legs have been positively detected on said platform for differences; and
- e. displaying presence of any differences on said display.

8. A method for obtaining an indication of mass and position of a metal object connected to a leg of a subject using a system as claimed in claim 6, comprising the steps of:

- a. applying current to a first left-foot electromagnetic coil, and a first right-foot electromagnetic coil in turn, for a short time period that is typically several milliseconds, and recording eddy current signals therefrom;
- b. comparing signal from the first left-foot electromagnetic coil with signal from the first right-foot electromagnetic coil to eliminate effect of background interference;
- c. positively detecting the presence of a subject's legs, correctly positioned with respect to said indication on said platform via a detection system;

- d. comparing signal obtained from first left-foot electromagnetic coil with signal obtained from first right-foot electromagnetic coil when the presence of a correctly positioned subject's legs have been positively detected on said platform for differences indicating presence of a metal object;
- 5 e. comparing signal obtained from secondary left-foot electromagnetic coils with signal obtained from primary left-foot electromagnetic coil to obtain an indication of mass and position of a metal object situated on left leg;
- 10 f. comparing signal obtained from secondary right-foot electromagnetic coils with signal obtained from primary right-foot electromagnetic coil to obtain an indication of mass and position of a metal object situated on left leg; and
- g. displaying details of any suspected metal objects on said display.
- 15 9. A method of assembling a metal detecting facility for detecting metal objects attached to the lower leg of a subject; said method comprising the steps of:
- a. enclosing a primary pair of horizontally aligned electromagnetic coils within a platform;
- b. connecting said pair of horizontally aligned electromagnetic coils via an oscillator and a switch, to a processor such that current is supplied to each of said pair of horizontally aligned electromagnetic coils in turn;
- 20 c. indicating correct positioning of a subjects feet on upper surface of said platform;
- d. attaching a foot detection means to said platform for detection of feet on upper surface of said platform, and connecting said foot detection means to said processor; and
- 25 e. coupling said processor to a display for indicating the detection of detected metal objects.

10. The method of claim 9 further comprising the step of attaching an electromagnetic damping screen in the vertical plane between said coils.
 11. The method of claim 9 further comprising incorporating secondary pairs of electromagnetic coils aligned at an angle to said primary pairs of electromagnetic coils.
- 5 12. A method for detecting metal objects concealed in a shoe or on the lower part of a leg of a subject using a device as claimed in claim 2, comprising the steps of:
- a. applying current to a first left-foot electromagnetic coil, and a first right-foot electromagnetic coil in turn for a short time period that is typically several milliseconds and recording eddy current signals therefrom;
 - 10 b. comparing signal from the first left-foot electromagnetic coil with signal from the first right-foot electromagnetic coil to eliminate effect of background interference;
 - c. positively detecting the presence of a subject's legs, correctly positioned with respect to said indication on said platform via a detection system;
 - 15 d. comparing signal obtained from first left-foot electromagnetic coil with signal obtained from first right-foot electromagnetic coil when the presence of a correctly positioned subject's legs have been positively detected on said platform for differences; and
 - e. displaying presence of any differences on said display.
- 20 13. A method for detecting metal objects concealed in a shoe or on the lower part of a leg of a subject using a device as claimed in claim 3, comprising the steps of:
- a. applying current to a first left-foot electromagnetic coil, and a first right-foot electromagnetic coil in turn for a short time period that is typically several milliseconds and recording eddy current signals therefrom;
 - 25 b. comparing signal from the first left-foot electromagnetic coil with signal from the first right-foot electromagnetic coil to eliminate effect of background interference;

- 5 c. positively detecting the presence of a subject's legs, correctly positioned with respect to said indication on said platform via a detection system;
- d. comparing signal obtained from first left-foot electromagnetic coil with signal obtained from first right-foot electromagnetic coil when the presence of a correctly positioned subject's legs have been positively detected on said platform for differences; and
- e. displaying presence of any differences on said display.

14. A method for detecting metal objects concealed in a shoe or on the lower part of a leg of a subject using a device as claimed in claim 4, comprising the steps of:

- 10 a. applying current to a first left-foot electromagnetic coil, and a first right-foot electromagnetic coil in turn for a short time period that is typically several milliseconds and recording eddy current signals therefrom;
- 15 b. comparing signal from the first left-foot electromagnetic coil with signal from the first right-foot electromagnetic coil to eliminate effect of background interference;
- c. positively detecting the presence of a subject's legs, correctly positioned with respect to said indication on said platform via a detection system;
- d. comparing signal obtained from first left-foot electromagnetic coil with signal obtained from first right-foot electromagnetic coil when the presence of a correctly positioned subject's legs have been positively detected on said platform for differences; and
- e. displaying presence of any differences on said display.

15. A method for detecting metal objects concealed in a shoe or on the lower part of a leg of a subject using a device as claimed in claim 5, comprising the steps of:

- 20 a. applying current to a first left-foot electromagnetic coil, and a first right-foot electromagnetic coil in turn for a short time period that is typically several milliseconds and recording eddy current signals therefrom;

- b. comparing signal from the first left-foot electromagnetic coil with signal from the first right-foot electromagnetic coil to eliminate effect of background interference;
- c. positively detecting the presence of a subject's legs, correctly positioned with respect to said indication on said platform via a detection system;
- 5 d. comparing signal obtained from first left-foot electromagnetic coil with signal obtained from first right-foot electromagnetic coil when the presence of a correctly positioned subject's legs have been positively detected on said platform for differences; and
- 10 e. displaying presence of any differences on said display.
16. A method for detecting metal objects concealed in a shoe or on the lower part of a leg of a subject using a device as claimed in claim 6, comprising the steps of:
- a. applying current to a first left-foot electromagnetic coil, and a first right-foot electromagnetic coil in turn for a short time period that is typically several milliseconds and recording eddy current signals therefrom;
- 15 b. comparing signal from the first left-foot electromagnetic coil with signal from the first right-foot electromagnetic coil to eliminate effect of background interference;
- c. positively detecting the presence of a subject's legs, correctly positioned with respect to said indication on said platform via a detection system;
- 20 d. comparing signal obtained from first left-foot electromagnetic coil with signal obtained from first right-foot electromagnetic coil when the presence of a correctly positioned subject's legs have been positively detected on said platform for differences; and
- e. displaying presence of any differences on said display.